Lesson # 92

Conversions with Two Unit Rates

Date

Warmup:

1. Write two rates involving days and years

$$\frac{days}{years} \quad and \quad \frac{years}{days}$$

2. Multiply $\left(\frac{10}{12}\right)\left(\frac{60}{100}\right)\left(\frac{5}{25}\right)$

3. Convert: 13 mile = _____ yards

4. Convert: 7 feet = _____ yards

I. Cancel Unit Rates in Unit Conversions

Unit Conversions: Multiply by unit rates to cancel the units.

Each unit rate equals 1

Since 8 ounces = 1 cup $\frac{8\ ounces}{1\ cup} = 1$

To convert 30 ounces to pints, use Unit Rates to cancel the pints. Two unit rates will be needed.

$$30\ ounces \cdot \frac{1\ cup}{8\ ounces} \cdot \frac{1\ pint}{2\ cups} = \_\_\_\_\_\ pints$$

Unit Conversions

Metric Equivalent Measures
10 mm = 1 cm
100 cm = 1 m
1000 m = 1 km

Us Customary Volume and Capacity Equivalent Measures
8 ounces = 1 cup
2 cups = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon

Us Customary Time Equivalent Measures
60 seconds = 1 minute
60 minutes = 1 hour
24 hours = 1 day
7 days = 1 week
52 weeks = 1 year
365 days = 1 year
366 days = 1 leap year
12 months = 1 year

Us Customary Length Equivalent Measures
12 inches = 1 foot
3 feet = 1 yard
5280 feet = 1 mile
1760 yards = 1 mile

Us Customary to metric conversion
2.54 cm = 1 inch

Cross out the units

$$10560\ inches \cdot \frac{1\ foot}{12\ inches} \cdot \frac{1\ mile}{5280\ feet} = \frac{\qquad\qquad\qquad\qquad}{miles}$$

Cross out the units

$$2\ km \cdot \frac{1000\ m}{1\ km} \cdot \frac{10\ cm}{1\ m} = \underline{\qquad\qquad\qquad} cm$$

5. ***Cross out the units***

$$3\ hours \cdot \frac{60\ minutes}{1\ hour} \cdot \frac{60\ seconds}{1\ minute} = \underline{\qquad\qquad\qquad} seconds$$

6. ***Cross out the units***

$$14\ years \cdot \frac{365\ days}{1\ year} \cdot \frac{24\ hours}{1\ day} = \underline{\qquad\qquad\qquad} hours$$

II. Determine Which Unit Rates To Use

To determine which unit rates to use

1. **Determine the unit rates to cancel the original units.**
2. **Determine the unit rates that use the ending units.**
3. **The unit rates to use will have the same 'third' units.**

Convert 100 cm to feet

The unit rates with cm:

2.54 cm = 1 inch
10 mm = 1 cm
100 cm = 1 m

The unit rates with feet:

12 inches = 1 foot
3 feet = 1 yard
5280 feet = 1 mile

2.54 cm = 1 inch
12 inches = 1 foot

_____ · _____ · _____ = _____

Determine the unit rates used to convert 10 gallons to pints.

_____ · _____ · _____ = _____

Determine the unit rate used to convert 4 inches to yards.

_____ · _____ · _____ = _____

7. Determine the unit rate used to convert 4 inches to yard

8. Determine the unit rate used to convert 12 quarts to cups

III. Convert Units Using Two Unit Rates

To convert 5 pints to ounces, use Unit Rates to cancel the pints. Two unit rates will be needed.

$$5 \text{ pints} \cdot \frac{2 \text{ cups}}{1 \text{ pint}} \cdot \frac{8 \text{ ounces}}{1 \text{ cup}} = \_\_\_\_\_ \text{ ounces}$$

To convert 10 pints to gallons, use Unit Rates to cancel the cups. Two unit rates will be needed.

$$20 \text{ pints} \cdot \frac{1 \text{ quart}}{8 \text{ pints}} \cdot \frac{1 \text{ gallon}}{2 \text{ quarts}} = \_\_\_\_\_ \text{ gallons}$$

Determine the unit rate used to convert 2 weeks to hours

9. Determine the unit rate used to convert 13 weeks to hours

10. Determine the unit rates used in the calculation, then convert 7 mm to m.

IV. Practice

11

12

13

14

15

16

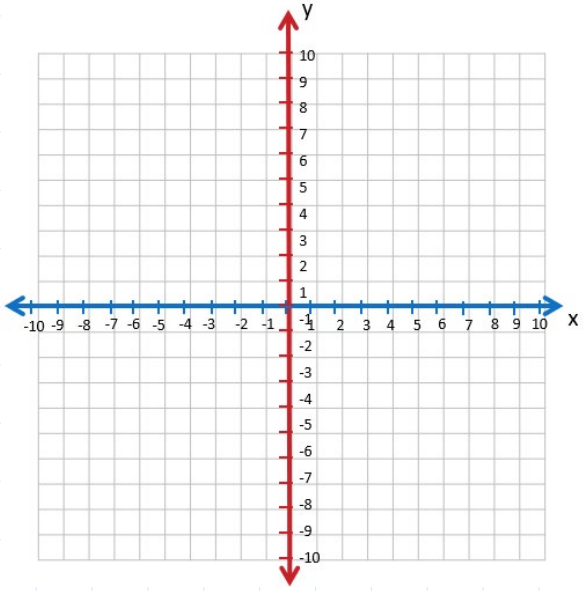
17

18

19

20

21



22